

# Semiconductor Photonic Waveguide Structures Made by a Reactive Beam Etching Technique

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## Abstract

A  $\text{Br}_2\text{-N}_2$  reactive beam etching technique that produces smooth and vertical sidewall etching shapes has been developed and applied to the construction of semiconductor photonic waveguide devices. The low-loss and polarization-insensitive deep-ridge waveguides made by the etching technique has been used to form high performance multimode interference couplers and arrayed waveguide grating filters. Deeply etched submicrometer wide grooves were demonstrated as the surface grating for DFB lasers, which were made without a regrowth process.